25 24
~~26~~. The control device of claim ~~25~~ wherein said coating has a thickness of up to 0.25 inch.

Cont 07

26 25
~~27~~. The control device of claim ~~26~~ being a track ball.

27 25
~~28~~. The control device of claim ~~26~~ further including an axially disposed hole.---

REMARKS

The title and abstract have both been amended to more precisely recite Applicants' invention as embodied in the claims.

The specification has been amended to correct grammatical errors.

Claims 1 and 8 have been amended to more precisely identify that the magnetic portion has uniformly convex walls that terminate at opposing polar portions. This limitation is found in claims 4 and 15 and has been deleted from those claims.

Claim 3 has been amended to more precisely recite that neodymium is a preferred magnetic material as disclosed in Applicants' specification at page 4, lines 30-31.

Claim 9 has been amended to identify that the first magnet (reference numeral 68 in figure 8) is shaped as a cylinder with the north and south poles disposed along sidewalls of the cylinder.

Claim 19 has been amended to more precisely recite a relationship between the magnet and magnetic sensors that effectively provides an essentially linear relationship. Support for the essentially linear relationship is found in Applicants' specification at page 12, lines 1-2 and support for the combination of the magnet and magnetic sensors is found in Applicants' specification at page 6, lines 7-9.

The preamble to claim 20 has been amended to conform to amended claim 21.

New claims 21-28 further limit and define the control device of claim 19.

In claim 21, the magnetic component has a shape with uniformly convex sidewalls that terminate at opposing polar portions as disclosed in Applicants' specification at page 6, lines 3-4.

In claim 22, the opposing polar portions are planar as disclosed in Applicants' specification at page 5, line 32.

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In claim 23, the distance between opposing polar planar portions provides the magnetic device with a desired angle of rotation. Support for this new claim is found in Applicants' specification at page 5, line 33.

In claim 24, concave portions are disposed between the uniformly convex sidewalls to provide a controlled non-linear relationship over a portion of the angle of rotation of the device. Support for this claim is found in Applicants' specification at page 7, lines 15-18.

In claim 25, the magnet is coated with a non-magnetic material as disclosed in Applicants' specification at page 7, line 31. The thickness of this non-magnetic material ranges up to the entire air gap, typically 0.25 inch, as disclosed in Applicants' specification a page 6, line 13 and recited in new claim 26.

In claim 27, the control device is a track ball as disclosed in Applicants' specification at page 12, line 5.

In claim 28, the control device further includes an axially disposed hole as disclosed in applicants' specification at page 4, line 19.

The Examiner objected to the title of the invention as non-descriptive. A new title has been proposed that is believed to more clearly describe the invention to which the claims are directed.

The Examiner objected to the abstract of the disclosure as not setting forth the nature and gist of the invention. A revised abstract that is believed to set forth the nature and gist of the invention has been submitted.

Claims 9-20 were rejected under 35 U.S.C. 112, second paragraph as indefinite. The Examiner indicated that the expression "sidewalls" in line 2 of claim 9 was unclear. Claim 9 has been amended to more precisely identify that this first magnet (identified by reference numeral 68 in figure 8) is cylindrical in shape and the north and south poles are located along the sidewalls of this cylinder.

The Examiner objected to claim 19 as having a gap between the elements and lacking a structural relationship between the magnet and the magnetic properties. Claim 19 has been amended to claim the combination of the magnet and at least one magnetic sensor and is now believed to conform with the requirements of 35 U.S.C. 112, second paragraph.

It is respectfully requested that the §112 rejections to the claims be removed.

Applicants' claim 1 is drawn to a spheroidal component having a magnetic portion. The magnetic portion further has uniformly convex walls. As disclosed in

Applicants' specification at page 6, lines 25-27, use of the magnetic component of the invention provides an air gap "d" that remains constant as the magnet is rotated due to the convex curvature of the outer wall of the magnetic component. With reference to Applicants' specification at page 12, lines 1-2, each sensor generates a linear output. The capability to achieve a linear output from a magnetic device without the requirement to include electronic signal processing is not taught or suggested by any of the references of record in the present application.

Claims 1-3, 8-14 and 19-20 were rejected under 35 U.S.C. 103 as unpatentable over JP 58-66381 and common knowledge in the art.

Applicants have obtained a translation of the Japanese reference and include a copy with this response as a convenience to the Examiner.

The Japanese publication discloses a non-magnetic spheroidal member containing an embedded cylindrical magnet. Rotation of the spheroidal member in the presence of a magnetic sensor generates a sinusoidal output. As disclosed in page 1 of the English translation, electronic signal processing is required to convert the sinusoidal output to a linear output.

As the Examiner rightly points out, three directional magnetic field measurement with three sensors is well known in the art. This technique is used for spatial position location but is not believed to have utility for determining a relationship between angle position and magnetic flux density.

There is nothing in the combination of JP 58-66381 with the common knowledge in the art to teach or suggest Applicants' invention as embodied in the claims where a magnetic portion has uniformly convex sidewalls such that a constant air gap is maintained when the magnetic portion is rotated and a linear relationship exists between angle position and magnetic flux density without the need for electronic signal processing. Applicants' claims should be allowed over the combination of references.

Applicants gratefully acknowledge the Examiner's indication that claims 4-7 and 15-18 would be allowable if amended to overcome the rejections under 35 U.S.C. 112 and to include all the limitations of the base claim and any intervening claims. A portion of claim 4 has been incorporated into claim 1 and a portion of claim 15 has been incorporated into claim 8. For the reasons discussed above, claim 1 and 9, and the claims dependent therefrom, are believed to be patentable over the cited references.

Claim 19 has been amended to claim a magnet having a shape effective to provide a linear relationship between angle position and magnetic flux density. Since such a shape is neither taught nor suggested by the prior art of reference, applicants claim 19 and the claims dependent therefrom should be allowed over the combination of references.

LETTER RE FORMAL DRAWINGS

A Letter Re Formal Drawings accompanies this Amendment.

Entry of this Amendment and reconsideration of the claims as amended is respectfully requested. If the Examiner feels that an additional amendment is required to place the claims in condition for allowance, is invited to contact applicants' attorney at the telephone number listed below.

Respectfully submitted,
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